

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

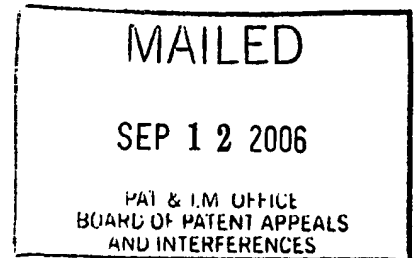
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES M. DERDERIAN

Appeal No. 2006-1925
Application No. 09/938,106¹

ON BRIEF



Before BLANKENSHIP, SAADAT, and MACDONALD, Administrative Patent Judges.

SAADAT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 23-27, 29-35, 40-51 and 53-64. Claims 1-22, 28 and 65-69 have been canceled and claims 36-39 and 52 have been withdrawn from consideration as being drawn to a non-elected invention.

We affirm.

¹ Application for patent filed August 23, 2001.

BACKGROUND

Appellant's invention relates to a multi-chip module in which two or more semiconductor devices are vertically stacked such that the distance between the adjacent devices is determined, at least in part, by the heights of the discrete conductive elements such as bond wires that protrude above an active surface of the lower device. An understanding of the invention can be derived from a reading of exemplary independent claim 23, which is reproduced as follows:

23. A method for assembling semiconductor devices, comprising:

providing a first semiconductor device;

placing discrete conductive elements over portions of the first semiconductor device; and

positioning a second semiconductor device at least partially over the first semiconductor device, a back side of the second semiconductor device resting upon at least some of the discrete conductive elements and being supported thereby, the back side and the at least some of the discrete conductive elements being electrically isolated from each other.

The Examiner relies on the following prior art references:

Lee et al. (Lee)	6,388,313	May 14, 2002 (filed Jan. 30, 2001)
Wu et al. (Wu)	6,400,007	Jun. 4, 2002 (filed Apr. 16, 2001)
Shim et al (Shim)	6,531,784	Mar. 11, 2003 (filed Jun. 2, 2000)

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Claims 23, 24, 29, 30, 33, 40, 45, 46, 49, 50, 53, 59 and 61-64 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Wu.

Claims 25, 26, 31, 34, 35, 41-44, 47, 51, 54-58 and 60 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu and Lee.

Claims 27, 32 and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu and Shim.

Rather than reiterate the opposing arguments, reference is made to the brief (filed September 26, 2005), the reply brief (filed February 16, 2006) and the answer (mailed December 15, 2005) for the respective positions of Appellant and the Examiner. Only those arguments actually made by Appellant have been considered in this decision. Arguments which Appellant could have made but chose not to make in the briefs have not been considered (37 CFR § 41.37(c)(1)(vii)).

OPINION

35 U.S.C. § 102(e) rejection of claims over Wu

The Examiner relies on Figure 4 of Wu and maintains the position that Wu provides for stacked semiconductor devices wherein the upper device is supported collectively by other elements such as the bond wires and the adhesive layer which form a complete package (answer, page 4). Appellant argues that the

upper device is merely stacked above the lower device "by adhered glue 50" such that the delicate wires of Wu do not necessarily support the upper device (brief, pages 9-10). The Examiner responds by pointing out that the claims do not require that the upper device be supported solely by the bond wires and instead, allows support by other elements by reciting "resting upon at least some of the discrete conductive elements" (answer, page 10). In response, Appellant argues that Figure 4 of Wu does not clearly show all of the features between the two devices and therefore cannot disclose whether the bond wires or the adhered glue 50 support the upper device (reply brief, pages 4-5).

A rejection for anticipation requires that the four corners of a single prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation. See Atlas Powder Co. v. Ireco Inc., 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999); In re Paulsen, 30 F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994). The inquiry as to whether a reference anticipates a claim must focus on what subject matter is encompassed by the claim and what subject matter is described by the reference. As set forth by the court in Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), it is only

necessary for the claims to "'read on' something disclosed in the prior art reference, i.e., all limitations of the claim are found in the reference, or 'fully met' by it." See also Atlas Powder Co. v. IRECO Inc., 190 F.3d at 1346, 51 USPQ2d at 1945 (Fed. Cir. 1999) (quoting Titanium Metals Corp. v. Banner, 778 F.2d 775, 781, 227 USPQ 773, 778 (Fed. Cir. 1985)).

In determining the subject matter encompassed by claim 23, we agree with the Examiner that the claim merely requires that the upper device be resting, among other things, upon the discrete elements. Although the claim recites that the upper device also be supported thereby, the claim as a whole does not preclude support by other elements in addition to the conductive elements. In that regard, Wu does disclose in Figure 4 that the plurality of wires 32 are located over the overflow glue 50 and together support the upper chip 34 (col. 3, lines 36-40). Similarly, we remain unconvinced by Appellant's argument that Figure 4 of Wu lacks sufficient detail related to the elements positioned between the upper chip and the lower chip and fails to show the claimed structure. In that regard, we rely on Figure 3 for showing the detail of all the elements over the lower chip that would support the upper chip, such as bond wires 32 and overflow glue 50 which form the dam-shape bumps at the upper edges of chip 28 (col. 3, lines 18-24). As pointed out by the

Examiner (answer, page 11), since the wires are in contact with the upper semiconductor chip, the second chip is supported at least by some of the wires. Therefore, Wu does disclose the claimed arrangement of the second chip in relation with the discrete conductive elements and therefore, anticipates claim 23.

Regarding claim 24, Appellant argues that Wu is merely concerned with isolating wires 32 from contacting the lower semiconductor die (brief, page 10). The examiner responds by pointing out that if preventing short circuiting is a concern of Wu, it is inherent that wires 32 are also isolated from the back side of the second semiconductor device (answer, page 12). We again agree with the Examiner that keeping the discrete conductive elements of the first semiconductor die from short circuiting with any other element is taught in Wu which inherently requires isolation from any other element that is in contact with wires 32.

With respect to claim 30, we agree with the Examiner (answer, page 13) that Wu sufficiently discloses the use of adhesive between the two semiconductor devices such that the second device is "drawn" toward the first device. We also remain unconvinced by Appellant that the claim requires any specific material for the glue such that it would shrink when cured (brief, page 10). Instead, the claim merely requires that the

two semiconductor devices be "drawn" toward each other, which is achieved by using glue.

Regarding claim 33, Appellant argues that Wu discloses that glue 50 is applied to first semiconductor die 28 before second device 34 is positioned thereover (brief, page 11). The Examiner responds (answer, page 13) by asserting that the claim does not require the arrangement argued by Appellant. We agree since the claim merely requires that "the applying is effected after the positioning the second semiconductor device," which may refer to any change in the adhesive after the placement of the second device, and not that the adhesive is applied after positioning of the second device. We also note that as pointed out by the Examiner (answer, page 13), Appellant's arguments regarding claims 50 and 53 are similar to those made with respect to claim 30.

In view of our analysis and the discussion made above with respect to the teachings of the reference, we find that Wu teaches all the recited elements and therefore, anticipates claims 23, 24, 30, 33, 50 and 53, as well as the other claims rejected together and argued as one group. Accordingly, the 35 U.S.C. § 102(e) rejection of claims 23, 24, 29, 30, 33, 40, 45, 46, 49, 50, 53, 59 and 61-64 is sustained.

35 U.S.C. § 103(a) rejection of claims over Wu and Lee

Regarding claims 25, 26, 31, 34, 35, 41-44, 47, 51, 54-58 and 60, Appellant argues that Wu and Lee lack proper motivation for combining (brief, page 14) while repeating the same arguments made above with respect to claim 30 (brief, pages 15-16). We again agree with the Examiner (answer, pages 14-15) that Lee provides the suggestion for isolating the discrete conductive elements by wrapping them in an encapsulating adhesive which isolates them from the semiconductor devices and the other conductive elements. We also find ourselves persuaded by the Examiner's position (answer, pages 15-17) that curing the resin glue of Wu would draw the two devices toward each other (col. 2, lines 25-27). Therefore, while Wu and Lee may not explicitly disclose that the devices are drawn toward each other, as held in In re Graves, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995), we find that a person of ordinary skill in the art would understand that the use of cured resin would have caused drawing the two devices toward each other. Therefore, we sustain the 35 U.S.C. § 103 rejection of claims 25, 26, 31, 34, 35, 41-44, 47, 51, 54-58 and 60 over Wu and Lee.

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35 U.S.C. § 103(a) rejection of claims over Wu and Shim

Turning now to the rejection of claims 27, 32 and 48, we find that Appellant merely recites the claimed limitations and points out that these claims should be allowed because of dependency upon their base claims (brief, pages 16-17). As we discussed the teachings of Wu with respect to claims 23 and 45, supra., we also find that the Examiner has made a reasonable case of prima facie obviousness with respect to the combination of Wu and Shim. Therefore, we also sustain the 35 U.S.C. § 103(a) rejection of claims 27, 32 and 48.

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